

**CIO Magazine**  
**December 15, 1999 / January 1, 2000**

**THE WEALTH OF KNOWLEDGE**

In his newest book, **Building Wealth**, noted economist Lester Thurow discusses the road to riches in a knowledge-based economy. This excerpt poses the question: Can intellectual property be protected in an age of connectivity? G

**By Lester C. Thurow**

Building Wealth: The New Rules for Individuals, Companies and Nations in a Knowledge-Based Economy

By Lester C. Thurow

HarperCollins Publishers Inc., \$27.50

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Knowledge-based capitalism isn't going to work without a new system for determining who owns or controls intellectual property rights.

In Thailand, up to 97 percent of the software in use has been illegally copied.

Skills and knowledge have become the only source of sustainable long-term competitive advantage. Intellectual property lies at the center of the modern company's economic success or failure, displacing the competitive advantages of the past. Proximity to raw materials once conferred an advantage on an economy, but now can be bought and moved to wherever they are needed. Access to capital once bestowed a significant advantage, but now capital is a commodity that can be borrowed in New York, Tokyo, London or from anywhere else in the world.

Knowledge, which used to be tertiary-after raw materials and capital-in determining economic success, is now primary. With this reality comes the need for more differentiated systems of determining who owns what intellectual property, better protection for whatever is owned and faster systems of dispute resolution when disputes arise-as they will.

Clear, easily enforceable, sellable ownership rights to intellectual property have to be established if capitalism is to work in a world where knowledge is the key to wealth. Reverse engineering (the politically correct phrase for copying) is a way of life in the corporate world. But where should the limits be? Whatever the answer, it's not to be found in a patent system more than a century old.

Everyone understands what it means to own land or productive equipment and how those rights can be enforced. It is not so clear, however, what it means to own knowledge or how those ownership rights can be enforced. Capitalists own the equipment their workforce uses, but can they own the knowledge their workforce uses? What part of their knowledge can employees take with them when they move to a new employer? How do employers stop employees from taking the employer's intellectual property when they go? Ownership rights to land and equipment last forever. Does the ownership of knowledge last forever? If not, how long does it last? Everyone knows the difference between public lands and private lands, but where is the dividing line between knowledge in the public domain and knowledge in the private domain? Even if the line can be defined, how is it to be enforced?

### **OLD SYSTEMS, NEW PROBLEMS**

Designed more than a hundred years ago to meet the simpler needs of an economy based upon natural resources and mechanical devices, our system of intellectual property rights is an undifferentiated, one-size-fits-all system. Consider the real case of a physician who noticed a relationship between an elevated level of a particular human hormone and a congenital birth defect. He was awarded a patent for his observation, although by itself his test had too many false positives to be useful. But later developments showed that if his test was used along with two others, they could accurately forecast whether a baby would be born with Down's syndrome. Today the physician is suing to get a \$9 fee from every laboratory that uses his part of the test. If he wins, the cost of testing will more than double.

Should the physician who first observed how the existing gene works have some intellectual property rights? Probably. But they should not be the same kind of rights as those granted to someone who invents a new gene to replace the defective one. Noticing what an existing gene does is simply not equivalent to inventing a new gene. Biotechnology makes such distinctions necessary.

The prevailing wisdom among those who earn their living within our system of intellectual property protection is that some minor tweaking here and there will fix the problem. The prevailing wisdom is wrong. The time has come not for marginal changes but for wide-open thinking about designing a new system from the ground up. This is never going to happen if the problem is left to those who make their living operating the current system. They have too many vested interests in preserving it with the fewest possible modifications.

Without stronger systems of protection, companies will defend their economic positions by keeping their knowledge secret, but a recent study found that 73 percent of private patents were based on knowledge generated by public sources such as universities and nonprofit or government laboratories. Private, secretly held knowledge simply does not generate the next generation of knowledge. The exact line between what is and is not allowed is going to be difficult to draw.

## **ADVANCING KNOWLEDGE**

The differentiation must start with distinctions between fundamental advances in knowledge and logical extensions of existing knowledge. Each deserves a different kind of patent. Furthermore, new technologies are making the enforcement of property rights much tougher. People can use high-quality scanning technologies with optical character recognition to build electronic libraries quickly and cheaply. A system designed to allow people to browse through books from physical libraries cannot provide the right framework for dealing with the issues raised by the possibility of downloading a book from an electronic library.

If books can be freely downloaded, then those selling financial information will find that their databases can also be downloaded and resold by competitors whose costs are lower precisely because they did not incur the costs of creating them. Telephone book publishers try to stop this practice by inserting some phony numbers into the phone books so that they can prove in court that competitors have not independently generated their own list of names and numbers.

The future of printed materials can be seen in what is now happening in the recorded music business. Even though the equipment needed to record compact discs is too expensive to be found in every household, CD pirates may hold as much as a 20 percent share of the market. In contrast, in personal electronic publishing the equipment is as cheap and available as a personal computer plus a scanner. The fully electronic library does not yet exist, but it soon will. One is being built in Singapore. The legal system may be able to stop factories from copying and selling CDs or books in volume, but it cannot stop individuals from replicating materials for themselves or selling small numbers to their friends. One has to expect that pirated works will end up with an even bigger market share of what used to be conventionally printed materials than they now have of CDs and tapes.

Knowledge-based capitalism isn't going to work without a new system for determining who owns or controls intellectual property rights. Capitalism requires clear, easy-to-enforce ownership rights.

## **KNOWLEDGE PIRATES**

When computer makers ship their products "naked"-that is, without an operating system-as they often do in Asia, the only reason they do so is to allow the use of pirated software. These computer makers have the tacit approval of local governments to violate patents and copyrights. In Thailand, up to 97 percent of the software in use has been illegally copied, and even in the United States the figure may be as high as 40 percent. Estimates of pirated software in Europe range from a high of 80 percent in Spain to a low of 25 percent in the United Kingdom.

Computer software provides a good illustration of what happens when patent and copyright laws do not keep up with technology. Judges end up making decisions that they should not be making. One such decision ruled that the "look and feel" of a software program could not be patented-which means, effectively, that any successful program can be legally copied. The copiers need to write their own code, but they start knowing exactly what the program is supposed to do, how the internal programming components are structured, how the final program is supposed to look and feel, and that a viable market exists for the product. As a result, the copier has lower costs and faces much less market uncertainty and risk than the original writers of any successful software program. When software programs cannot be protected effectively, it is not just the Microsofts that will lose. Retailers that develop software to sell their products over the Internet will find that software copied and freely used by their competitors.

Increasingly, the acquisition of knowledge is central for both catch-up states and keep-ahead states. Smart developing countries understand that reality. Operating as a monopsonist (a monopoly buyer) and dangling access to its domestic market as an enticement, China has demanded the sharing of technology from companies such as Boeing and Reuters that sell in its markets. It doesn't need their capital, since it saves 30 percent of its income and has accumulated \$100 billion in international exchange reserves-but it demands their knowledge in return for the right to operate in China. Americans deplore China's demands but remember fondly from their high school history classes the clever Yankee engineer with a photographic memory who visited British textile mills in the early 1800s and then reconstructed those mills in New England. Initially Americans were equally amused in the aftermath of World War II when Japanese businessmen with their cameras were ubiquitously touring U.S. factories. They are no longer amused. Few today will let Third World visitors into their plants.

### **THE THIRD WORLD CATCHES UP**

Yet copying to catch up is the only way to catch up. Every country that has caught up has done it by copying. Third World countries know that unless they can acquire the necessary knowledge, they will never make it into the first world. Third World countries cannot afford to buy what they need-even if those who have the knowledge are willing to sell, and they are not. They have to copy.

The managing partner of a large U.S. consulting firm urged his fellow consultants to recommend relocation to India because Indians were very good at copying, had few laws making copying illegal and often did not enforce the laws that did exist. He remarked that India recognized patents only on the processes for making drugs, not on the drugs themselves, but then went on to say that Indians were very good at developing alternative manufacturing processes. The fact that no one checks those processes very closely to see that they are really different was left unsaid. Nor did he need to say that what was made in India could be

slipped quietly into the channels of world commerce without anyone having to pay for knowledge that would be considered proprietary elsewhere.

While one can understand why developing countries do not want to pay royalties for using the drugs necessary to keep their citizens healthy, it is harder to make a similar case for why they should be allowed to pirate Madonna CDs. And India does just as much of the second as it does of the first.

The issues are not just those of where a country stands in the invention cycle or where it stands on the economic development ladder. Different cultures and different parts of the world look at intellectual property rights quite differently. The idea that people should be paid to be creative is a point of view that stems from the Judeo-Christian-Muslim belief in a God that created humanity in his image. It has no analogue in Hindu, Buddhist or Confucian societies. There are real differences in beliefs about what should be freely available in the public domain and what should be for sale in the private marketplace. In Asia, few pieces of ancient art have the names of their creators inscribed upon them. Knowledge is seen as a free good, since there is no concept of it having to be created by human beings using expensive processes.

Yet despite these differences in economic positions, cultures and historic practices, no system of protecting intellectual property rights can work unless most of the governments of the world agree to enforce it. A law that does not exist or is not enforced in country X is essentially a law that cannot be enforced in country Y. If one tries to enforce the law in country Y, production simply moves to country X to escape regulation.

What different countries want, need and should have in a system of intellectual property rights is very different depending on their level of economic development. National systems, such as that of the United States, are not going to evolve into de facto world standards. The economic game of catch-up is not the game of keep-ahead. Countries playing either game have the right to a world system that lets them succeed. Whatever system is built, it will have to be a global system that allows for this diversity of positions and beliefs.

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